



45

Attorney Docket No. 01107.00098

**PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of )  
Nicholas NICOLAIDES et al. )  
Serial No. 09/780,675 )  
Filed: February 12, 2001 )

For: METHODS FOR GENERATING HYPERMUTABLE MICROBES

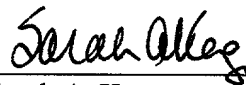
**SUBMISSION OF SEQUENCE LISTING**

Assistant Commissioner of Patents & Trademarks  
Washington, D.C. 20231

Dear Sir:

A paper copy and a CRF of a sequence listing are submitted herewith to place the application in compliance with U.S. regulations. I believe that the sequences in the two forms of the sequence listing are identical and add no new matter to the application.

Respectfully submitted,



Sarah A. Kagan  
Reg. No. 32,141

Date: June 11, 2001

BANNER & WITCOFF, LTD.  
1001 G Street, N.W. – Eleventh Floor  
Washington, D.C. 20001-4597  
Telephone: 202/508-9100





SEQUENCE LISTING

<110> Nicolaides, Nicholas  
Sass, Philip  
Grasso, Luigi  
Vogelstein, Bert  
Kinzler, Kenneth

<120> METHODS FOR GENERATING HYPERMUTABLE  
MICROBES

<130> 01107.00100

<140> US01/04339

<141> 2001-02-12

<150> 60/181,929

<151> 2000-02-11

<160> 26

<170> FastSEQ for Windows Version 3.0

<210> 1

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR PRIMER

<400> 1

acgcatatgg agcgagctga gagctcgagt

30

<210> 2

<211> 75

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR PRIMER

<400> 2

gaattcttat cacgtagaat cgagaccgag gagaggggta gggataggct taccagttcc  
aaccttcgcc gatgc

60

75

<210> 3

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> PCR PRIMER

<400> 3

acgcatatgt gtccttggcg gcctaga

27

<210> 4

<211> 75  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR PRIMER

<400> 4  
 gaattcttat tacgtagaat cgagaccgag gagaggggta gggataggct tacccatgtg 60  
 tgatgtttca gagct 75

<210> 5  
 <211> 3218  
 <212> DNA  
 <213> *Saccharomyces cerevisiae*

<400> 5  
 aaataggaat gtgatacctt ctattgcatg caaagatagt gtaggaggcg ctgctattgc 60  
 caaagacttt tgagaccgct tgctgtttca ttatagttag ggagttctcg aagacgagaa 120  
 attagcagtt ttcggtgttt agtaatcgcg ctagcatgct aggacaattt aactgcaaaa 180  
 ttttgatacg atagtgatag taaatggaag gtaaaaaata catagaccta tcaataagca 240  
 atgtctctca gaataaaagc acttgatgca tcagtgggta acaaaattgc tgcagggtgag 300  
 atcataatat cccccgtaaa tgctctcaaa gaaatgatgg agaattccat cgatgcgaat 360  
 gctacaatga ttgatattct agtcaaggaa ggaggaatta aggtacttca aataacagat 420  
 aacggatctg gaattaataa agcagacctg ccaatcttat gtgagcgatt caccgactcc 480  
 aaattacaaa aattcgaaga tttgagtcag attcaaactg atggattccg aggagaagct 540  
 ttagccagta tctcacatgt ggcaagagtc acagtaacga caaaagttaa agaagacaga 600  
 tgtgcatgga gagtttcata tgcagaaggt aagatgttgg aaagcccaa acctgttgct 660  
 ggaaaagacg gtaccacgat cctagttaga gacctttttt tcaatattcc ttctagatta 720  
 agggccttga ggtcccataa tgatgaatac tctaaaatat tagatgttgt cgggcgatac 780  
 gccattcatt ccaaggacat tggcttttct tgtaaaaagt tccggagactc taattattct 840  
 ttatcagtta aaccttcata tacagtcacg gataggatta ggactgtgtt caataaatct 900  
 gtggcttctga atttaattac ttttcatatc agcaaagtag aagattttaa cctggaaagc 960  
 gttgatggaa aggtgtgtaa tttgaatttc atatccaaaa agtccatttc attaattttt 1020  
 ttcatataa atagactagt gacatgtgat cttctaagaa gagctttgaa cagcgtttac 1080  
 tccaattatc tggcaaaggg cttcagacct tttattttatt tgggaattgt tatagatccg 1140  
 gcggctgttg atgttaacgt tcacccgaca aagagagagg ttcgtttcct gagccaagat 1200  
 gagatcatag agaaaatcgc caatcaattg caccgccaat tatctgccat tgatacttca 1260  
 cgtactttca aggcttcttc aatttcaaca aacaagccag agtcattgat accatttaac 1320  
 gacaccatag aaagtgatag gaataggaag agtctccgac aagcccaagt ggtagagaat 1380  
 tcatatacga cagccaatag tcaactaagg aaagcgaaaa gacaagagaa taaactagtc 1440  
 agaatagatg cttcacaaagc taaaattacg tcattttttat cctcaagtca acagttcaac 1500  
 tttgaaggat cgtctacaaa gcgacaactg agtgaaccca aggttaacaaa tgtaagccac 1560  
 tccaagagg cagaaaagct gacactaaat gaaagcgaac aaccgcgtga tgccaatata 1620  
 atcaatgata atgacttgaa ggatcaacct aagaagaaac aaaagttggg ggattataaa 1680  
 gttccaagca ttgccgatga cgaaaagaat gcaactccga tttcaaaaga cgggtatatt 1740  
 agagtaccta aggagcgagt taatgttaat cttacgagta tcaagaaatt gcgtgaaaaa 1800  
 gtagatgatt cgatacatcg agaactaaca gacatttttg caaatttgaa ttacgttggg 1860  
 gttgtagatg aggaaagaag attagccgct attcagcatg acttaaagct ttttttaata 1920  
 gattacggat ctgtgtgcta tgagctattc tatcagattg gtttgacaga cttcgcaaac 1980  
 tttggtaaga taaacctaca gagtacaaat gtgtcagatg atatagtttt gtataatctc 2040  
 ctatcagaat ttgacgagt aaatgacgat gcttccaaag aaaaaataat tagtaaaata 2100  
 tgggacatga gcagtatgct aaatgagtag tattccatag aattgggtgaa tgatgggtcta 2160  
 gataatgact taaagtctgt gaagctaaaa tctctaccac tactttttaa aggctacatt 2220  
 ccatctctgg tcaagttacc attttttata tatcgcttgg gtaaagaagt tgattgggag 2280  
 gatgaacaag agtgtctaga tgggtatttt agagagattg cattactcta tatacctgat 2340  
 atggttccga aagtcgatac actcgtatgca tcgttgtcag aagacgaaaa agcccagttt 2400  
 ataaatagaa aggaacacat atcctcatta ctagaacacg ttctcttccc ttgtatcaaa 2460  
 cgaaggttcc tggcccttag acacattctc aaggatgtcg tggaaatagc caaccttcca 2520

bioRxiv preprint doi: <https://doi.org/10.1101/000000>; this version posted January 1, 2014. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

gatctataca	aagtttttga	gaggtgttaa	ctttaaaacg	ttttggctgt	aataccaaag	2580
tttttgttta	tttcctgagt	gtgattgtgt	ttcatttgaa	agtgtatgcc	ctttccttta	2640
acgattcatt	cgcgagattt	caaaggatat	gaaatatggg	tgcagttagg	aaagtatgtc	2700
agaaatgtat	attcggattg	aaactcttct	aatagttctg	aagtcacttg	gttccgtatt	2760
gttttcgtcc	tcttcctcaa	gcaacgattc	ttgtctaagc	ttattcaacg	gtaccaaaga	2820
cccagtcctt	tttatgagag	aaaacatttc	atcatttttc	aactcaatta	tcttaatatc	2880
atthttgtagt	atthttgaaaa	caggatggta	aaacgaatca	cctgaatcta	gaagctgtac	2940
cttgtcccat	aaaagtttta	atthtactgag	ccttttcggtc	aagtaaaacta	gtttatctag	3000
ttttgaaccg	aataattgtgg	gcagatttgc	agtaagtcca	gttagatcta	ctaaaagtgt	3060
tttgacagca	gccgattcca	caaaaatttg	gtaaaaggag	atgaaagaga	cctcgcgcgt	3120
aatggtttgc	atcaccatcg	gatgtctgtt	gaaaaactca	ctttttgcat	ggaagttatt	3180
aacaataaga	ctaattgatta	ccttagaata	atgtataa			3218

<210> 6

<211> 3056

<212> DNA

<213> Mus musculus

<400> 6

gaattccggt	gaaggtcctg	aagaattttcc	agattcctga	gtatcattgg	aggagacaga	60
taacctgtcg	tcaggtaacg	atgggtgtata	tgcaacagaa	atgggtgttc	ctggagacgc	120
gtcttttccc	gagagcggca	ccgcaactct	cccgcggtga	ctgtgactgg	aggagtccctg	180
catccatgga	gcaaaccgaa	ggcgtgagta	cagaatgtgc	taaggccatc	aagcctattg	240
atgggaagtc	agtcctatcaa	atthgttctg	ggcaggtgat	actcagttta	agcaccgctg	300
tgaaggagtt	gatagaaaaat	agtgtagatg	ctgggtgtac	tactattgat	ctaaggctta	360
aagactatgg	ggtggacctc	attgaagttt	cagacaatgg	atgtggggta	gaagaagaaa	420
actttgaagg	tctagctctg	aaacatcaca	catctaagat	tcaagagttt	gccgacctca	480
cgcaggttga	aacttttcggc	tttcgggggg	aagctctgag	ctctctgtgt	gcactaagtg	540
atgtcactat	atctacctgc	cacgggtctg	caagcgttgg	gactcgactg	gtgtttgacc	600
ataatgggaa	aatcacccag	aaaactccct	acccccgacc	taaaggaacc	acagtcagtg	660
tgcagcactt	atthttataca	ctacctgtgc	gttaciaaaga	gtttcagagg	aacattaaaa	720
aggagtattc	caaaatgggtg	caggtccttac	aggcgactctg	tatcatctca	gcaggcgctcc	780
gtgtaagctg	cactaatcag	ctcggacagg	ggaagcggca	cgtctgtggg	tgacaaagcg	840
gcacgtctgg	catgaaggaa	aatatcgggt	ctgtgtttgg	ccagaagcag	ttgcaaagcc	900
tcatttccttt	tgcttcagctg	ccccctagt	acgctgtgtg	tgaagagtac	ggcctgagca	960
cttcaggacg	ccacaaaacc	ttttctacgt	ttcgggcttc	atthtcacagt	gcacgcacgg	1020
cgcggggagg	agtgcacacg	acaggcagtt	tttcttcac	aatcagaggc	cctgtgaccc	1080
agcaaaggct	tctaagcttg	tcaatgaggt	tttatcacat	gtataaccgg	catcagttacc	1140
cattttgtcgt	ccttaacggt	tccgttgact	cagaatgtgt	ggatattaat	gtaactccag	1200
ataaaaaggca	aattctacta	caagaagaga	agctattgct	ggccggtttta	aagacctcct	1260
tgataggaat	gtttgacagt	gatgcaaaca	agcttaattgt	caaccagcag	ccactgtctag	1320
atgttggaagg	taacttagta	aagctgcata	ctgcagaact	agaaaagcct	gtgccaggaa	1380
agcaagataa	ctctccttca	ctgaagagca	cagcagacga	gaaaagggtg	gcatccatct	1440
ccaggctgag	agaggccttt	tctcttcac	ctactaaaga	gatcaagtct	aggggtccag	1500
agactgctga	actgacacgg	agttttccaa	gtgagaaaag	gggcgtgtta	tcctcttatc	1560
cttcagacgt	catctcttac	agaggcctcc	gtggctcgca	ggacaaattg	gtgagtccca	1620
cggacagccc	tggtgactgt	atggacagag	agaaaataga	aaaagactca	gggctcagca	1680
gcacctcagc	tggtctctgag	gaagagttca	gcacccacga	agtggccagt	agcttttagca	1740
gtgactataa	cgtgagctcc	ctagaagaca	gaccttctca	ggaaaccata	aactgtgggtg	1800
acctggactg	ccgtcctcca	ggtacaggac	agtccttgaa	gccagaagac	catggatatc	1860
aatgcaaaagc	tctacctcta	gctcgtctgt	caccacaaa	tgccaagcgc	ttcaagacag	1920
aggaaagacc	ctcaaattgtc	aacattttctc	aaagattgcc	tggtcctcag	agcacctcag	1980
cagctgagggt	cgatgtagcc	ataaaaatga	ataagagaat	cgtgctcctc	gagttctctc	2040
tgagttctct	agctaagcga	atgaagcagt	tacagcacct	aaaggcgcag	aacaaacatg	2100
aactgagtta	cagaaaattt	agggccaaga	tttgccctgg	agaaaaccaa	gcagcagaag	2160
atgaactcag	aaaagagatt	agtaaatcga	tgthttgcaga	gatggagatc	ttgggtcagt	2220
ttaacctggg	atthtatagta	accaaactga	aagaggacct	cttcctgggtg	gaccagcatg	2280
ctgcggtatga	gaagtacaac	tttgagatgc	tgacagcaga	cacgggtgctc	caggcgcaga	2340
ggctcatcac	acccacagact	ctgaacttaa	ctgctgtcaa	tgaagctgta	ctgatagaaa	2400

atctggaaat	attcagaaag	aatggctttg	actttgtcat	tgatgaggat	gctccagtca	2460
ctgaaagggc	taaattgatt	tccttaccac	ctagtaaaaa	ctggaccttt	ggaccccaag	2520
atatagatga	actgatcttt	atgttaagt	acagccctgg	ggatcatgtg	cggccctcac	2580
gagtcagaca	gatgtttgct	tccagagcct	gtcggaagtc	agtgatgatt	ggaacggcgc	2640
tcaatgcgag	cgagatgaag	aagctcatca	cccacatggg	tgagatggac	cacccttgga	2700
actgccccca	cggcaggcca	accatgaggg	acgttgccaa	tctggatgtc	atctctcaga	2760
actgacacac	cccttgtagc	atagagttta	ttacagattg	ttcggtttgc	aaagagaagg	2820
ttttaagtaa	tctgattatc	gttgtagaaa	aattagcatg	ctgctttaat	gtactggatc	2880
catttaaaag	cagtgttaag	gcaggcatga	tggagtgttc	ctctagctca	gctacttggg	2940
tgatccggtg	ggagctcatg	tgagcccagg	actttgagac	cactccgagc	cacattcatg	3000
agactcaatt	caaggacaaa	aaaaaaaaa	tatttttgaa	gcctttttaa	aaaaaa	3056

<210> 7  
 <211> 2771  
 <212> DNA  
 <213> Homo sapiens

<400> 7						
cgaggcggat	cgggtgttgc	atccatggag	cgagctgaga	gctcgagtac	agaacctgct	60
aaggccatca	aacctattga	tcggaagtca	gtccatcaga	tttgctctgg	gcaggtggta	120
ctgagtctaa	gcactgcggt	aaaggagtta	gtagaaaaca	gtctggatgc	tggtgccact	180
aatattgatc	taaagcttaa	ggactatgga	gtggatctta	ttgaagtttc	agacaatgga	240
tgtggggtag	aagaagaaaa	cttcgaaggc	ttaactctga	aacatcacac	atctaagatt	300
caagagtttg	ccgacctaac	tcagggtgaa	acttttggct	ttcgggggga	agctctgagc	360
tcactttgtg	cactgagcga	tgccaccatt	tctacctgcc	acgcacccgc	gaaggttggg	420
actcgactga	tgtttgatca	caatgggaaa	attatccaga	aaaccccta	ccccgcgcc	480
agagggacca	cagtcagcgt	gcagcagtta	tttccacac	tacctgtgcg	ccataaggaa	540
tttcaaagga	atattaagaa	ggagtatgcc	aaaatgggtc	aggtcttaca	tgcatactgt	600
atcatttcag	caggcatccg	tgtaagttgc	accaatcagc	ttggacaagg	aaaacgacag	660
cctgtggtat	gcacaggtgg	aagccccagc	ataaaggaaa	atatcggtc	tgtgtttggg	720
cagaagcagt	tgcaaagcct	cattcctttt	gttcagctgc	cccctagtga	ctccgtgtgt	780
gaagagtacg	gtttgagctg	ttcggatgct	ctgcataatc	ttttttacat	ctcaggtttc	840
atttcacaat	gcacgcacgt	agttggaagg	agttcaacag	acagacagtt	tttctttatc	900
aaccggcggc	cttgtgaccc	agcaaaggtc	tgccagactc	tgaatgaggt	ctaccacatg	960
tataatcgac	accagtatcc	atttgtgtgt	cttaacattt	ctgttgattc	agaatgcgtt	1020
gatatcaatg	ttactccaga	taaaaggcaa	attttgtctc	aagaggaaaa	gcttttgttg	1080
gcagttttta	agacctcttt	gataggaatg	tttgatagtg	atgtcaacaa	gctaaatgtc	1140
agtcagcagc	cactgctgga	tgttgaagg	aacttaataa	aatgcatg	agcggatttg	1200
gaaaagccca	tggtagaaaa	gcaggatcaa	tccccttcac	taaggactgg	agaagaaaaa	1260
aaagacgtgt	ccatttccag	actgcgagag	gccttttctc	ttcgtcacac	aacagagaa	1320
aagcctcaca	gccccaaag	tcagaaacca	agaaggagcc	ctctaggaca	gaaaaggggt	1380
atgctgtctt	ctagcacttc	aggtgccatc	tctgacaaa	gcgtcctgag	acctcagaaa	1440
gaggcagtga	gttccagtca	cggaccaggt	gacctacgg	acagagcggg	gggtggagaag	1500
gactcggggc	acggcagcac	ttccgtggat	tctgaggggt	tcagcatccc	agacacgggc	1560
agtcactgca	gcagcgagta	tgccggccagc	tccccagggg	acaggggctc	gcaggacat	1620
gtggactctc	aggagaaagc	gcctgaaact	gacgactctt	tttcagatgt	ggactgccat	1680
tcaaaccagg	aagataccgg	atgtaaat	cgagttttgc	ctcagccaac	taatctcgca	1740
accccaaaca	caaagcgttt	taaaaaagaa	gaaattcttt	ccagttctga	catttgtcaa	1800
aagttagtaa	atactcagga	catgtcagcc	tctcaggttg	atgtagctgt	gaaaattaat	1860
aagaaagtgt	tgcccttgga	cttttctatg	agttctttag	ctaaacgaat	aaagcagtta	1920
catcatgaag	cacagcaag	tgaaggggaa	cagaattaca	ggaagttag	ggcaaagatt	1980
tgtcctggag	aaaatcaag	agccgaagat	gaactaagaa	aagagataag	taaaacgatg	2040
tttgagaaaa	tggaaatcat	tggtcagttt	aacctgggat	ttataataac	caaactgaat	2100
gaggatatct	tcatagtggg	ccagcatgcc	acggacgaga	agtataactt	cgagatgctg	2160
cagcagcaca	ccgtgtctca	ggggcagagg	ctcatagcac	ctcagactct	caacttaact	2220
gctgttaatg	aagctgttct	gatagaaaat	ctggaaatat	ttagaaagaa	tggctttgat	2280
tttgttatcg	atgaaaatgc	tccagtcact	gaaagggcta	aactgatttc	cttgccaact	2340
agtaaaaact	ggaccttcgg	accccaggac	gtcagatgaac	tgatcttcat	gctgagcgac	2400
agccctgggg	tcatgtgccg	gccttcccga	gtcaagcaga	tgtttgcttc	cagagcctgc	2460

cggaagtcgg	tgatgattgg	gactgctctt	aacacaagcg	agatgaagaa	actgatcacc	2520
cacatggggg	agatggacca	cccctggaac	tgtcccatg	gaaggccaac	catgagacac	2580
atcgccaacc	tgggtgtcat	ttctcagaac	tgaccgtagt	cactgtatgg	aataattggt	2640
tttatcgag	atTTTTatgt	tttgaaagac	agagtcttca	ctaacctttt	ttgttttaaa	2700
atgaaacctg	ctacttaaaa	aaaatacaca	tcacacccat	ttaaaagtga	tcttgagAAC	2760
cttttcaaac	c					2771

<210> 8  
 <211> 3063  
 <212> DNA  
 <213> Homo sapiens

<400> 8						
ggcacgagtg	gctgcttgcg	gctagtggat	ggtaattgcc	tgcctcgcg	tagcagcaag	60
ctgctctgtt	aaaagcgaaa	atgaaacaat	tgcctcgggc	aacagttcga	ctcctttcaa	120
gttctcagat	catcacttcg	gtggctcagt	ttgtaaaaga	gcttattgaa	aactccttgg	180
atgctggtgc	cacaagcgta	gatgttaaac	tggagaacta	tggatttgat	aaaattgagg	240
tgcgagataa	cggggagggt	atcaaggctg	ttgatgcacc	tgtaatggca	atgaagtact	300
acacctcaaa	aataaatagt	catgaagatc	ttgaaaattt	gacaacttac	ggttttcgtg	360
gagaagcctt	ggggtcaatt	tgttgatatg	ctgagggtttt	aattacaaca	agaacggctg	420
ctgataattt	tagcaccag	tatgttttag	atggcagtg	ccacatactt	tctcagaaac	480
cttcacatct	tgggtcaagg	acaactgtaa	ctgctttaag	attatttaag	aatctacctg	540
taagaaagca	gttttactca	actgcaaaaa	aatgtaaaga	tgaaataaaa	aagatccaag	600
atctcctcat	gagctttgg	atccttaaac	ctgacttaag	gattgtcttt	gtacataaca	660
aggcagttat	ttggcagaaa	agcagagtat	cagatcacaa	gatggctctc	atgtcagttc	720
tggggactgc	tgttatgaac	aatatggaat	cctttcagta	ccactctgaa	gaatctcaga	780
tttatctcag	tggatttctt	ccaaagtgtg	atgcagacca	ctctttcact	agtctttcaa	840
caccagaaa	aagtttcatc	ttcataaaca	gtcgaccagt	acatcaaaaa	gatatcttaa	900
agttaatccg	acatcattac	aatctgaaat	gcctaaagga	atctactcgt	ttgtatcctg	960
ttttctttct	gaaaatcgat	gttcctacag	ctgatgttga	tgtaaattta	acaccagata	1020
aaagccaagt	attattacaa	aataaggaat	ctgttttaat	tgctcttgaa	aatctgatga	1080
cgacttggtt	tggaccatta	cctagtacaa	attcttatga	aaataataaa	acagatgttt	1140
ccgcagctga	catcgttctt	agtaaaacag	cagaaacaga	tgtgcttttt	aataaagtgg	1200
aatcatctgg	aaagaattat	tcaaagtgtg	atacttcagt	cattccattc	caaaatgata	1260
tgcataatga	tgaatctgga	aaaaacactg	atgattgttt	aaatcaccag	ataagtattg	1320
gtgacttttg	ttatgggtcat	tgtagttagt	aaatttctaa	cattgataaa	aacactaaga	1380
atgcatttca	ggacatttca	atgagtaatg	tatcatggga	gaactctcag	acggaatata	1440
gtaaaacttg	ttttataagt	tccgttaagc	acaccagtc	agaaaatggc	aataaagacc	1500
atatagatga	gagtggggaa	aatgaggaag	aagcaggtct	tgaaaactct	tcggaatttt	1560
ctgcagatga	gtggagcagg	ggaaatatac	ttaaaaattc	agtgggagag	aatattgaac	1620
ctgtgaaaat	tttagtgctt	gaaaaaagtt	taccatgtaa	agtaagtaat	aataattatc	1680
caatccctga	acaaatgaat	cttaatgaag	attcatgtaa	caaaaaatca	aatgtaatag	1740
ataataaatc	tggaaaagtt	acagcttatg	atttacttag	caatcgagta	atcaagaaac	1800
ccatgtcagc	aagtgtctct	tttgttcaag	atcatcgtcc	tcagtttctc	atagaaaatc	1860
ctaagactag	tttagaggat	gcaacactac	aaattgaaga	actgtggaag	acattgagtg	1920
aagaggaaaa	actgaaatat	gaagagaagg	ctactaaaga	cttggaacga	tacaatagtc	1980
aaatgaagag	agccattgaa	caggagtcac	aaatgtcact	aaaagatggc	agaaaaaaga	2040
taaaaccac	cagcgcatgg	aatttgccc	agaagcacaa	gttaaaaacc	tcattatcta	2100
atcaaccaaa	acttgatgaa	ctccttcagt	cccaaattga	aaaaagaagg	agtcaaaata	2160
ttaaaatggt	acagatcccc	ttttctatga	aaaacttaaa	aataaatttt	aagaaacaaa	2220
acaaaagttg	cttagaagag	aaggatgaac	cttgcttgat	ccacaatctc	aggtttctctg	2280
atgcatggct	aatgacatcc	aaaacagagg	taattgtatt	aaatccatat	agagtagaag	2340
aagccctgct	attttaaaaga	cttcttgaga	atcataaact	tcctgcagag	ccactggaaa	2400
agccaattat	gttaacagag	agtcttttta	atggatctca	ttatttagac	gttttatata	2460
aaatgacagc	agatgaccaa	agatacagtg	gatcaactta	cctgtctgat	cctcgtctta	2520
cagcgaatgg	tttcaagata	aaattgatac	caggagtttc	aattactgaa	aattacttgg	2580
aaatagaagg	aatggctaata	tgtctcccat	tctatggagt	agcagattta	aaagaaattc	2640
ttaatgctat	attaacacaga	aatgcaaagg	aagtttatga	atgtagacct	cgcaaagtga	2700
taagttattt	agaggggagaa	gcagtgcgtc	tatccagaca	attacccatg	tacttatcaa	2760



aaatgtcaga	agaaaacatc	acaataaagt	taaaacagct	aaaagctgaa	gtaatagcaa	2820
agaataatag	ctttgtaaat	gaaatcattt	cacgaataaa	agttactacg	tgaaaaatcc	2880
cagtaatgga	atgaaggtaa	tattgataag	ctattgtctg	taatagtttt	atattgtttt	2940
atattaaccc	tttttccata	gtgttaactg	tcagtgccca	tgggctatca	acttaataag	3000
atatttagta	atattttact	ttgaggacat	tttcaaagat	ttttattttg	aaaaatgaga	3060
gctgtaactg	aggactgttt	gcaattgaca	taggcaataa	taagtgatgt	gctgaatttt	3120
ataaataaaa	tcattgtagtt	tgtgg				3145

<210> 10

<211> 2484

<212> DNA

<213> Homo sapiens

<400> 10

cttggctctt	ctggcgccaa	aatgtcggtc	gtggcagggg	ttattcggcg	gctggacgag	60
acagtgggtg	accgcatcgc	ggcgggggaa	gttatccagc	ggccagctaa	tgctatcaaa	120
gagatgattg	agaactgttt	agatgcaaaa	tccacaagta	ttcaagtgat	tgtaaagag	180
ggaggcctga	agttgattca	gatccaagac	aatggcaccg	ggatcaggaa	agaagatctg	240
gatattgtat	gtgaaaagggt	cactactagt	aaactgcagt	cctttgagga	tttagccagt	300
atttctacct	atggcttttcg	aggtgaggct	ttggccagca	taagccatgt	ggctcatgtt	360
actattacaa	cgaaaacagc	tgatggaaag	tgtgcataca	gagcaagtta	ctcagatgga	420
aaactgaaag	cccctcctaa	accatgtgct	ggcaatcaag	ggaccagat	cacggtggag	480
gacctttttt	acaacatagc	cacgaggaga	aaagctttta	aaaatccaag	tgaagaatat	540
gggaaaattt	tggaaagtgt	tggcagggtat	tcagtacaca	atgcaggcat	tagttttctca	600
gttaaaaaac	aaggagagac	agtagctgat	gttaggacac	tacccaatgc	ctcaaccgtg	660
gacaatatcc	gctccatctt	tggaaatgct	gttagtcgag	aactgataga	aattggatgt	720
gaggataaaa	ccctagcctt	caaaatgaat	ggttacatat	ccaatgcaaa	ctactcagt	780
aagaagtgc	tcttcttact	cttcatcaac	catcgtctgg	tagaatcaac	ttccttgaga	840
aaagccatag	aaacagtgt	tgcagcctat	ttgccccaaa	acacacaccc	attcctgtac	900
ctcagtttag	aaatcagtc	ccagaatgtg	gatgttaatg	tgcacccac	aaagcatgaa	960
gttcacttcc	tgcacgagga	gagcatcctg	gagcgggtgc	agcagcacat	cgagagcaag	1020
ctcctgggct	ccaattcctc	caggatgtac	ttcaccacga	ccttgctacc	aggacttgct	1080
ggccccctctg	gggagatgg	taaaaccaca	acaagtctga	cctcgtcttc	tacttctgga	1140
agtagtgata	aggtctatgc	ccaccagatg	gttcgtacag	attcccggga	acagaagctt	1200
gatgcatttc	tgcagcctct	gagcaaaccc	ctgtccagtc	agccccaggc	cattgtcaca	1260
gagataaaga	cagatatttc	tagtggcagg	gctaggcagc	aagatgagga	gatgcttgaa	1320
ctcccagccc	ctgctgaagt	ggctgccaaa	aatcagagct	tggaggggga	tacaacaaag	1380
gggacttcag	aatgtcaga	gaagagagga	cctacttcca	gcaaccccag	aaagagacat	1440
cggaagatt	ctgatgtgga	aatgggtggaa	gatgattccc	gaaaggaaat	gactgcagct	1500
tgtaccccc	ggagaaggat	cattaacctc	actagtgttt	tgagtctcca	ggaagaaatt	1560
aatgagcagg	gacatgaggt	tctccggggag	atgttgcata	accactcctt	cgtgggctgt	1620
gtgaatcctc	agtgggcctt	ggcacagcat	caaaccaagt	tataccttct	caacaccacc	1680
aagcttagtg	aagaactgtt	ctaccagata	ctcatttatg	attttgcca	ttttgggtgt	1740
ctcaggttat	cggagccagc	accgctcttt	gaccttgcca	tgcttgctt	agatagtcca	1800
gagagtggct	ggacagagga	agatggtccc	aaagaaggac	ttgctgaata	cattgttgag	1860
tttctgaaga	agaaggctga	gatgcttgca	gactatttct	ccttggaat	tgatgaggaa	1920
gggaacctga	ttggattacc	ccttctgatt	gacaactatg	tgcccccttt	ggagggactg	1980
cctatcttca	ttcttcgact	agccactgag	gtgaattggg	acgaagaaaa	ggaatgtttt	2040
gaaagcctca	gtaaagaatg	cgctatgttc	tattccatcc	ggaagcagta	catatctgag	2100
gagtcgaccc	tctcaggcca	gcagagtga	gtgcctggct	ccattccaaa	ctcctggaag	2160
tggactgttg	aacacattgt	ctataaagcc	ttgcgctcac	acattctgcc	tcctaaacat	2220
ttcacagaag	atggaaatat	cctgcagctt	gctaacctgc	ctgatctata	caaagtcttt	2280
gagaggtgtt	aaatatggtt	atttatgcac	tgtgggatgt	gtttcttttt	ctctgtattc	2340
cgatacaaa	tggtgtatca	aagtgtgata	tacaaagtgt	accaacataa	gtgttggtag	2400
cacttaagac	ttatacttgc	cttctgatag	tattccttta	tacacagtgg	attgattata	2460
aataaataga	tgtgtcttaa	cata				2484

<210> 11

<211> 426



<212> DNA  
<213> Homo sapiens

<400> 11

cgaggcggat	cggggtgttgc	atccatggag	cgagctgaga	gctcgagtac	agaacctgct	60
aaggccatca	aacctattga	tcggaagtca	gtccatcaga	tttgctctgg	gcagggtggta	120
ctgagtctaa	gcactgcggt	aaaggagtta	gtagaaaaca	gtctggatgc	tgggtgccact	180
aatattgatc	taaagcttaa	ggactatgga	gtggatctta	ttgaagtttc	agacaatgga	240
tgtggggtag	aagaagaaaa	cttcgaaggc	ttaactctga	aacatcacac	atctaagatt	300
caagagtttg	ccgacctaac	tcaggttgaa	acttttggct	ttcgggggga	agctctgagc	360
tcactttgtg	cactgagcga	tgtcaccatt	tctacctgcc	acgcatcggc	gaaggttgga	420
acttga						426

<210> 12  
<211> 1408  
<212> DNA  
<213> Homo sapiens

<400> 12

ggcgctccta	cctgcaagtg	gctagtgcc	agtgtgggc	cgccgctcct	gccgtgcatg	60
ttggggagcc	agtacatgca	ggtgggtccc	acacggagag	ggg'gcgagac	ccggtgacag	120
ggctttacct	ggtacatcgg	catggcgcaa	ccaaagcaag	agagggtggc	gcgtgccaga	180
caccaacggt	cggaaaccgc	cagacaccaa	cggtcggaaa	ccgccaaagac	accaacgctc	240
ggaaaccgcc	agacaccaac	gctcggaaac	cgccagacac	caaggctcgg	aatccacgcc	300
aggccacgac	ggaggggcgac	tacctccctt	ctgacctcgc	tgctggcgctt	cggaaaaaac	360
gcagtcgggt	gtgctctgat	tgggtccaggc	tctttgacgt	cacggactcg	acctttgaca	420
gagccactag	gcgaaaagga	gagacgggaa	gtattttttc	cgccccgccc	ggaaaggggtg	480
gagcacaacg	tcgaaagcag	ccgttgggag	cccaggaggc	gggggcgcctg	tgggagccgt	540
ggaggggaact	ttcccagtc	ccgaggcgga	tccggtgttg	catccttgga	gcgagctgag	600
aactcgagta	cagaacctgc	taaggccatc	aaacctattg	atcggaagtc	agtccatcag	660
atttgctctg	ggccggtggg	accgagtcta	aggccgaatg	cgggtgaagga	gttagtagaa	720
aacagtctgg	atgctggtgc	cactaatgtt	gatctaaagc	ttaaggacta	tggagtggat	780
ctcattgaag	tttcaggcaa	tggatgtggg	gtagaagaag	aaaacttcga	aggccttact	840
ctgaaacatc	acacatgtaa	gattcaagag	tttgccgacc	taactcaggt	ggaaactttt	900
ggctttcggg	gggaagctct	gagctcactt	tgtgcaactga	gtgatgtcac	catttctacc	960
tgccgtgtat	cagcgaaggt	tgggactcga	ctgggtgttg	atcactatgg	gaaaatcatc	1020
cagaaaacc	cctacccccg	ccccagaggg	atgacagtca	gcgtgaagca	gttattttct	1080
acgctacctg	tgcaccataa	agaatttcaa	aggaaatatta	agaagaaacg	tgcctgcttc	1140
cccttcgcct	tctgccgtga	ttgtcagttt	cctgaggcct	ccccagccat	gcttcctgta	1200
cagcctgtag	aactgactcc	tagaagtacc	ccaccccacc	cctgtcctct	ggaggacaac	1260
gtgatcactg	tattcagctc	tgtcaagaat	gggtccaggtt	cttctagatg	atctgcacaa	1320
atggttcttc	tctccttccc	tgatgtctgc	cattagcatt	ggaataaagt	tcctgctgaa	1380
aatccaaaaa	aaaaaaaaaa	aaaaaaaaaa				1408

<210> 13  
<211> 1785  
<212> DNA  
<213> Homo sapiens

<400> 13

tttttagaaa	ctgatgttta	ttttccatca	accatttttc	catgctgctt	aagagaatat	60
gcaagaacag	cttaagacca	gtcagtgggt	gtccctaccc	attcagtggc	ctgagcagtg	120
gggagctgca	gaccagtctt	ccgtggcagg	ctgagcgctc	cagtcttcag	tagggaattg	180
ctgaataggc	acagagggca	cctgtacacc	ttcagaccag	tctgcaacct	caggctgagt	240
agcagtgaac	tcaggagcgg	gagcagtcca	ttcaccctga	aattcctcct	tgggtcactgc	300
cttctcagca	gcagcctgct	cttctttttc	aatctcttca	ggatctctgt	agaagtacag	360
atcaggcatg	acctcccatg	ggtgttcacg	ggaaatgggtg	ccacgcacgc	gcagaacttc	420
ccgagccagc	atccaccaca	ttaaaccac	tgagtgcagc	cccttggtgt	tgcatgggat	480
ggcaatgtcc	acatagcgca	gaggagaatc	tgtgttacac	agcgcaatgg	taggtaggtt	540

aacataagat	gcctccgtga	gagggcgaagg	ggcggcgggga	cccgggcctg	gcccgtatgt	600
gtccttggcg	gcctagacta	ggcgcgtcgct	gtatgggtgag	ccccagggag	gcggtatctgg	660
gccccagaaa	ggacacccgc	ctggatttgc	cccgtagccc	ggccccgggccc	cctcggggagc	720
agaacagcct	tggtgaggtg	gacaggaggg	gacctcgcga	gcagacgcgc	gcgccagcga	780
cagcagcccc	gccccggcct	ctcgggagcc	ggggggcaga	ggctgcggag	ccccaggagg	840
gtctatcagc	cacagtctct	gcatgtttcc	aagagcaaca	ggaaatgaac	acattgcagg	900
ggccagtgtc	attcaaagat	gtggctgttg	atttcaccca	ggaggagtgg	cggcaactgg	960
accctgatga	gaagatagca	tacgggggatg	tgatgttggg	gaactacagc	catctagttt	1020
ctgtggggta	tgattatcac	caagccaaac	atcatcatgg	agtggaggtg	aaggaagtgg	1080
agcagggaga	ggagccgtgg	ataatggaag	gtgaatttcc	atgtcaacat	agtccagaac	1140
ctgctaaggc	catcaaacct	attgatcgga	agtcagtcca	tcagatttgc	tctggggccag	1200
tggtactgag	tctaagcact	gcagtgaagg	agttagtaga	aaacagtctg	gatgctgggtg	1260
ccactaatat	tgatctaaag	cttaaggact	atggagtggg	tctcattgaa	gtttcagaca	1320
atggatgtgg	ggtagaagaa	gaaaactttg	aaggcttaat	ctctttcagc	tctgaaacat	1380
cacacatgta	agattcaaga	gtttgccgac	ctaactgaag	ttgaaacttt	cggttttcag	1440
ggggaagctc	tgagctcact	gtgtgcactg	agcgatgtca	ccattttctac	ctgccacgcg	1500
ttggtgaagg	ttgggactcg	actggtgttt	gatcacgatg	ggaaaatcat	ccaggaaacc	1560
ccctaccccc	accccagagg	gaccacagtc	agcgtgaagc	agttattttc	tacgctacct	1620
gtgcgcata	aggaatttca	aaggaatatt	aagaagacgt	gcctgcttcc	ccttcgcctt	1680
ctgccgtgat	tgtcagtttc	ctgaggcctc	cccagccatg	cttctgttac	agcctgcaga	1740
actgtgagtc	aattaaacct	ctttttcttca	taaattaaaa	aaaaa		1785

<210> 14  
 <211> 795  
 <212> DNA  
 <213> Homo sapiens

<400> 14						
atgtgtcctt	ggcggcctag	actaggccgt	cgctgtatgg	tgagccccag	ggaggcggat	60
ctggggcccc	agaaggacac	ccgcctggat	ttgccccgta	gccccggccc	ggccccctcg	120
gagcagaaca	gccttggtga	ggtggacagg	aggggacctc	gcgagcagac	gcgcgcgcca	180
gcgacagcag	ccccgccccg	gcctctcggg	agccgggggg	cagaggctgc	ggagccccag	240
gagggctctat	cagccacagt	ctctgcatgt	ttccaagagc	aacaggaaat	gaacacattg	300
cagggggccag	tgctattcaa	agatgtggct	gtggatttca	cccaggagga	gtggcggcaa	360
ctggaccctg	atgagaagat	agcatacggg	gatgtgatgt	tgagaaacta	cagccatcta	420
gtttctgtgg	ggtatgatta	tcaccaagcc	aaacatcatc	atggagtggg	ggtgaaggaa	480
gtggagcagg	gagaggagcc	gtggataatg	gaagggtgaat	ttccatgtca	acatagtcca	540
gaacctgcta	aggccatcaa	acctattgat	cggaagtcag	tccatcagat	ttgctctggg	600
ccagtggtag	tgagtctaag	cactgcagtg	aaggagttag	tagaaaacag	tctggatgct	660
ggtgccacta	atattgatct	aaagcttaag	gactatggag	tggatctcat	tgaagtttca	720
gacaatggat	gtggggtaga	agaagaaaaac	tttgaaggct	taatctcttt	cagctctgaa	780
acatcacaca	tgtaa					795

<210> 15  
 <211> 769  
 <212> PRT  
 <213> Saccharomyces cerevisiae

<400> 15	
Met Ser Leu Arg Ile Lys Ala Leu Asp Ala Ser Val Val Asn Lys Ile	
1 5 10 15	
Ala Ala Gly Glu Ile Ile Ile Ser Pro Val Asn Ala Leu Lys Glu Met	
20 25 30	
Met Glu Asn Ser Ile Asp Ala Asn Ala Thr Met Ile Asp Ile Leu Val	
35 40 45	
Lys Glu Gly Gly Ile Lys Val Leu Gln Ile Thr Asp Asn Gly Ser Gly	
50 55 60	
Ile Asn Lys Ala Asp Leu Pro Ile Leu Cys Glu Arg Phe Thr Thr Ser	
65 70 75 80	



545					550					555				560	
Asp	Tyr	Gly	Ser	Val	Cys	Tyr	Glu	Leu	Phe	Tyr	Gln	Ile	Gly	Leu	Thr
				565					570					575	
Asp	Phe	Ala	Asn	Phe	Gly	Lys	Ile	Asn	Leu	Gln	Ser	Thr	Asn	Val	Ser
			580					585					590		
Asp	Asp	Ile	Val	Leu	Tyr	Asn	Leu	Leu	Ser	Glu	Phe	Asp	Glu	Leu	Asn
		595					600					605			
Asp	Asp	Ala	Ser	Lys	Glu	Lys	Ile	Ile	Ser	Lys	Ile	Trp	Asp	Met	Ser
	610					615					620				
Ser	Met	Leu	Asn	Glu	Tyr	Ser	Ile	Glu	Leu	Val	Asn	Asp	Gly	Leu	
625					630				635					640	
Asp	Asn	Asp	Leu	Lys	Ser	Val	Lys	Leu	Lys	Ser	Leu	Pro	Leu	Leu	Leu
				645					650					655	
Lys	Gly	Tyr	Ile	Pro	Ser	Leu	Val	Lys	Leu	Pro	Phe	Phe	Ile	Tyr	Arg
			660					665					670		
Leu	Gly	Lys	Glu	Val	Asp	Trp	Glu	Asp	Glu	Gln	Glu	Cys	Leu	Asp	Gly
		675					680					685			
Ile	Leu	Arg	Glu	Ile	Ala	Leu	Leu	Tyr	Ile	Pro	Asp	Met	Val	Pro	Lys
	690					695				700					
Val	Asp	Thr	Leu	Asp	Ala	Ser	Leu	Ser	Glu	Asp	Glu	Lys	Ala	Gln	Phe
705					710					715				720	
Ile	Asn	Arg	Lys	Glu	His	Ile	Ser	Ser	Leu	Leu	Glu	His	Val	Leu	Phe
				725					730					735	
Pro	Cys	Ile	Lys	Arg	Arg	Phe	Leu	Ala	Pro	Arg	His	Ile	Leu	Lys	Asp
			740				745					750			
Val	Val	Glu	Ile	Ala	Asn	Leu	Pro	Asp	Leu	Tyr	Lys	Val	Phe	Glu	Arg
		755				760						765			

Cys

<210> 16  
 <211> 859  
 <212> PRT  
 <213> Mus musculus

<400> 16

Met	Glu	Gln	Thr	Glu	Gly	Val	Ser	Thr	Glu	Cys	Ala	Lys	Ala	Ile	Lys
1				5					10					15	
Pro	Ile	Asp	Gly	Lys	Ser	Val	His	Gln	Ile	Cys	Ser	Gly	Gln	Val	Ile
			20					25					30		
Leu	Ser	Leu	Ser	Thr	Ala	Val	Lys	Glu	Leu	Ile	Glu	Asn	Ser	Val	Asp
		35					40					45			
Ala	Gly	Ala	Thr	Thr	Ile	Asp	Leu	Arg	Leu	Lys	Asp	Tyr	Gly	Val	Asp
	50					55					60				
Leu	Ile	Glu	Val	Ser	Asp	Asn	Gly	Cys	Gly	Val	Glu	Glu	Glu	Asn	Phe
65					70					75				80	
Glu	Gly	Leu	Ala	Leu	Lys	His	His	Thr	Ser	Lys	Ile	Gln	Glu	Phe	Ala
				85					90					95	
Asp	Leu	Thr	Gln	Val	Glu	Thr	Phe	Gly	Phe	Arg	Gly	Glu	Ala	Leu	Ser
			100					105					110		
Ser	Leu	Cys	Ala	Leu	Ser	Asp	Val	Thr	Ile	Ser	Thr	Cys	His	Gly	Ser
		115				120						125			
Ala	Ser	Val	Gly	Thr	Arg	Leu	Val	Phe	Asp	His	Asn	Gly	Lys	Ile	Thr
	130					135					140				
Gln	Lys	Thr	Pro	Tyr	Pro	Arg	Pro	Lys	Gly	Thr	Thr	Val	Ser	Val	Gln
145					150					155					160
His	Leu	Phe	Tyr	Thr	Leu	Pro	Val	Arg	Tyr	Lys	Glu	Phe	Gln	Arg	Asn
				165					170					175	
Ile	Lys	Lys	Glu	Tyr	Ser	Lys	Met	Val	Gln	Val	Leu	Gln	Ala	Tyr	Cys



Ala	Glu	Asp	Glu	Leu	Arg	Lys	Glu	Ile	Ser	Lys	Ser	Met	Phe	Ala	Glu
			660					665					670		
Met	Glu	Ile	Leu	Gly	Gln	Phe	Asn	Leu	Gly	Phe	Ile	Val	Thr	Lys	Leu
		675					680					685			
Lys	Glu	Asp	Leu	Phe	Leu	Val	Asp	Gln	His	Ala	Ala	Asp	Glu	Lys	Tyr
		690				695					700				
Asn	Phe	Glu	Met	Leu	Gln	Gln	His	Thr	Val	Leu	Gln	Ala	Gln	Arg	Leu
705					710					715					720
Ile	Thr	Pro	Gln	Thr	Leu	Asn	Leu	Thr	Ala	Val	Asn	Glu	Ala	Val	Leu
			725						730					735	
Ile	Glu	Asn	Leu	Glu	Ile	Phe	Arg	Lys	Asn	Gly	Phe	Asp	Phe	Val	Ile
			740					745					750		
Asp	Glu	Asp	Ala	Pro	Val	Thr	Glu	Arg	Ala	Lys	Leu	Ile	Ser	Leu	Pro
		755					760					765			
Thr	Ser	Lys	Asn	Trp	Thr	Phe	Gly	Pro	Gln	Asp	Ile	Asp	Glu	Leu	Ile
		770				775					780				
Phe	Met	Leu	Ser	Asp	Ser	Pro	Gly	Val	Met	Cys	Arg	Pro	Ser	Arg	Val
785					790					795					800
Arg	Gln	Met	Phe	Ala	Ser	Arg	Ala	Cys	Arg	Lys	Ser	Val	Met	Ile	Gly
			805					810						815	
Thr	Ala	Leu	Asn	Ala	Ser	Glu	Met	Lys	Lys	Leu	Ile	Thr	His	Met	Gly
			820					825					830		
Glu	Met	Asp	His	Pro	Trp	Asn	Cys	Pro	His	Gly	Arg	Pro	Thr	Met	Arg
		835				840						845			
His	Val	Ala	Asn	Leu	Asp	Val	Ile	Ser	Gln	Asn					
		850				855									

<210> 17  
 <211> 932  
 <212> PRT  
 <213> Homo sapiens

<400> 17

Met	Lys	Gln	Leu	Pro	Ala	Ala	Thr	Val	Arg	Leu	Leu	Ser	Ser	Ser	Gln
1				5					10					15	
Ile	Ile	Thr	Ser	Val	Val	Ser	Val	Val	Lys	Glu	Leu	Ile	Glu	Asn	Ser
			20					25					30		
Leu	Asp	Ala	Gly	Ala	Thr	Ser	Val	Asp	Val	Lys	Leu	Glu	Asn	Tyr	Gly
		35					40					45			
Phe	Asp	Lys	Ile	Glu	Val	Arg	Asp	Asn	Gly	Glu	Gly	Ile	Lys	Ala	Val
	50					55					60				
Asp	Ala	Pro	Val	Met	Ala	Met	Lys	Tyr	Tyr	Thr	Ser	Lys	Ile	Asn	Ser
65					70				75						80
His	Glu	Asp	Leu	Glu	Asn	Leu	Thr	Thr	Tyr	Gly	Phe	Arg	Gly	Glu	Ala
			85					90						95	
Leu	Gly	Ser	Ile	Cys	Cys	Ile	Ala	Glu	Val	Leu	Ile	Thr	Thr	Arg	Thr
			100					105					110		
Ala	Ala	Asp	Asn	Phe	Ser	Thr	Gln	Tyr	Val	Leu	Asp	Gly	Ser	Gly	His
		115					120					125			
Ile	Leu	Ser	Gln	Lys	Pro	Ser	His	Leu	Gly	Gln	Gly	Thr	Thr	Val	Thr
	130						135					140			
Ala	Leu	Arg	Leu	Phe	Lys	Asn	Leu	Pro	Val	Arg	Lys	Gln	Phe	Tyr	Ser
145					150					155					160
Thr	Ala	Lys	Lys	Cys	Lys	Asp	Glu	Ile	Lys	Lys	Ile	Gln	Asp	Leu	Leu
				165				170						175	
Met	Ser	Phe	Gly	Ile	Leu	Lys	Pro	Asp	Leu	Arg	Ile	Val	Phe	Val	His
		180						185					190		
Asn	Lys	Ala	Val	Ile	Trp	Gln	Lys	Ser	Arg	Val	Ser	Asp	His	Lys	Met
		195					200					205			

Ala	Leu	Met	Ser	Val	Leu	Gly	Thr	Ala	Val	Met	Asn	Met	Glu	Ser
210	215										220			
Phe	Gln	Tyr	His	Ser	Glu	Glu	Ser	Gln	Ile	Tyr	Leu	Ser	Gly	Phe
225					230					235				Leu
Pro	Lys	Cys	Asp	Ala	Asp	His	Ser	Phe	Thr	Ser	Leu	Ser	Thr	Pro
				245					250					255
Arg	Ser	Phe	Ile	Phe	Ile	Asn	Ser	Arg	Pro	Val	His	Gln	Lys	Asp
			260					265					270	Ile
Leu	Lys	Leu	Ile	Arg	His	His	Tyr	Asn	Leu	Lys	Cys	Leu	Lys	Glu
		275					280					285		Ser
Thr	Arg	Leu	Tyr	Pro	Val	Phe	Phe	Leu	Lys	Ile	Asp	Val	Pro	Thr
	290					295					300			Ala
Asp	Val	Asp	Val	Asn	Leu	Thr	Pro	Asp	Lys	Ser	Gln	Val	Leu	Leu
305					310					315				Gln
Asn	Lys	Glu	Ser	Val	Leu	Ile	Ala	Leu	Glu	Asn	Leu	Met	Thr	Thr
				325					330					335
Tyr	Gly	Pro	Leu	Pro	Ser	Thr	Asn	Ser	Tyr	Glu	Asn	Asn	Lys	Thr
			340					345					350	Asp
Val	Ser	Ala	Ala	Asp	Ile	Val	Leu	Ser	Lys	Thr	Ala	Glu	Thr	Asp
		355					360					365		Val
Leu	Phe	Asn	Lys	Val	Glu	Ser	Ser	Gly	Lys	Asn	Tyr	Ser	Asn	Val
	370					375					380			Asp
Thr	Ser	Val	Ile	Pro	Phe	Gln	Asn	Asp	Met	His	Asn	Asp	Glu	Ser
385					390					395				Gly
Lys	Asn	Thr	Asp	Asp	Cys	Leu	Asn	His	Gln	Ile	Ser	Ile	Gly	Asp
				405					410					415
Gly	Tyr	Gly	His	Cys	Ser	Ser	Glu	Ile	Ser	Asn	Ile	Asp	Lys	Asn
			420					425					430	Thr
Lys	Asn	Ala	Phe	Gln	Asp	Ile	Ser	Met	Ser	Asn	Val	Ser	Trp	Glu
		435						440				445		Asn
Ser	Gln	Thr	Glu	Tyr	Ser	Lys	Thr	Cys	Phe	Ile	Ser	Ser	Val	Lys
	450					455					460			His
Thr	Gln	Ser	Glu	Asn	Gly	Asn	Lys	Asp	His	Ile	Asp	Glu	Ser	Gly
465					470					475				Glu
Asn	Glu	Glu	Glu	Ala	Gly	Leu	Glu	Asn	Ser	Ser	Glu	Ile	Ser	Ala
				485					490					495
Glu	Trp	Ser	Arg	Gly	Asn	Ile	Leu	Lys	Asn	Ser	Val	Gly	Glu	Asn
			500					505					510	Ile
Glu	Pro	Val	Lys	Ile	Leu	Val	Pro	Glu	Lys	Ser	Leu	Pro	Cys	Lys
		515					520					525		Val
Ser	Asn	Asn	Asn	Tyr	Pro	Ile	Pro	Glu	Gln	Met	Asn	Leu	Asn	Glu
	530					535					540			Asp
Ser	Cys	Asn	Lys	Lys	Ser	Asn	Val	Ile	Asp	Asn	Lys	Ser	Gly	Lys
545					550					555				Val
Thr	Ala	Tyr	Asp	Leu	Leu	Ser	Asn	Arg	Val	Ile	Lys	Lys	Pro	Met
				565					570					575
Ala	Ser	Ala	Leu	Phe	Val	Gln								

Arg	Arg	Ser	Gln	Asn	Ile	Lys	Met	Val	Gln	Ile	Pro	Phe	Ser	Met	Lys
690						695					700				
Asn	Leu	Lys	Ile	Asn	Phe	Lys	Lys	Gln	Asn	Lys	Val	Asp	Leu	Glu	Glu
705				710						715					720
Lys	Asp	Glu	Pro	Cys	Leu	Ile	His	Asn	Leu	Arg	Phe	Pro	Asp	Ala	Trp
				725						730				735	
Leu	Met	Thr	Ser	Lys	Thr	Glu	Val	Met	Leu	Leu	Asn	Pro	Tyr	Arg	Val
			740						745					750	
Glu	Glu	Ala	Leu	Leu	Phe	Lys	Arg	Leu	Leu	Glu	Asn	His	Lys	Leu	Pro
		755					760					765			
Ala	Glu	Pro	Leu	Glu	Lys	Pro	Ile	Met	Leu	Thr	Glu	Ser	Leu	Phe	Asn
		770				775					780				
Gly	Ser	His	Tyr	Leu	Asp	Val	Leu	Tyr	Lys	Met	Thr	Ala	Asp	Asp	Gln
785					790					795					800
Arg	Tyr	Ser	Gly	Ser	Thr	Tyr	Leu	Ser	Asp	Pro	Arg	Leu	Thr	Ala	Asn
				805						810					815
Gly	Phe	Lys	Ile	Lys	Leu	Ile	Pro	Gly	Val	Ser	Ile	Thr	Glu	Asn	Tyr
			820						825					830	
Leu	Glu	Ile	Glu	Gly	Met	Ala	Asn	Cys	Leu	Pro	Phe	Tyr	Gly	Val	Ala
			835				840						845		
Asp	Leu	Lys	Glu	Ile	Leu	Asn	Ala	Ile	Leu	Asn	Arg	Asn	Ala	Lys	Glu
			850			855					860				
Val	Tyr	Glu	Cys	Arg	Pro	Arg	Lys	Val	Ile	Ser	Tyr	Leu	Glu	Gly	Glu
865					870					875					880
Ala	Val	Arg	Leu	Ser	Arg	Gln	Leu	Pro	Met	Tyr	Leu	Ser	Lys	Glu	Asp
				885						890					895
Ile	Gln	Asp	Ile	Ile	Tyr	Arg	Met	Lys	His	Gln	Phe	Gly	Asn	Glu	Ile
			900					905					910		
Lys	Glu	Cys	Val	His	Gly	Arg	Pro	Phe	Phe	His	His	Leu	Thr	Tyr	Leu
		915					920						925		
Pro	Glu	Thr	Thr												
			930												

<210> 18  
 <211> 932  
 <212> PRT  
 <213> Homo sapiens

Met	Lys	Gln	Leu	Pro	Ala	Ala	Thr	Val	Arg	Leu	Leu	Ser	Ser	Ser	Gln
1				5					10					15	
Ile	Ile	Thr	Ser	Val	Val	Ser	Val	Val	Lys	Glu	Leu	Ile	Glu	Asn	Ser
			20					25					30		
Leu	Asp	Ala	Gly	Ala	Thr	Ser	Val	Asp	Val	Lys	Leu	Glu	Asn	Tyr	Gly
		35					40					45			
Phe	Asp	Lys	Ile	Glu	Val	Arg	Asp	Asn	Gly	Glu	Gly	Ile	Lys	Ala	Val
		50				55					60				
Asp	Ala	Pro	Val	Met	Ala	Met	Lys	Tyr	Tyr	Thr	Ser	Lys	Ile	Asn	Ser
65					70					75					80
His	Glu	Asp	Leu	Glu	Asn	Leu	Thr	Thr	Tyr	Gly	Phe	Arg	Gly	Glu	Ala
			85						90					95	
Leu	Gly	Ser	Ile	Cys	Cys	Ile	Ala	Glu	Val	Leu	Ile	Thr	Thr	Arg	Thr
			100					105					110		
Ala	Ala	Asp	Asn	Phe	Ser	Thr	Gln	Tyr	Val	Leu	Asp	Gly	Ser	Gly	His
		115					120					125			
Ile	Leu	Ser	Gln	Lys	Pro	Ser	His	Leu	Gly	Gln	Gly	Thr	Thr	Val	Thr
		130				135					140				
Ala	Leu	Arg	Leu	Phe	Lys	Asn	Leu	Pro	Val	Arg	Lys	Gln	Phe	Tyr	Ser





Thr	Lys	Asp	Leu	Glu	Arg	Tyr	Asn	Ser	Gln	Met	Lys	Arg	Ala	Ile	Glu
625					630					635					640
Gln	Glu	Ser	Gln	Met	Ser	Leu	Lys	Asp	Gly	Arg	Lys	Lys	Ile	Lys	Pro
				645					650						655
Thr	Ser	Ala	Trp	Asn	Leu	Ala	Gln	Lys	His	Lys	Leu	Lys	Thr	Ser	Leu
			660					665					670		
Ser	Asn	Gln	Pro	Lys	Leu	Asp	Glu	Leu	Leu	Gln	Ser	Gln	Ile	Glu	Lys
		675					680					685			
Arg	Arg	Ser	Gln	Asn	Ile	Lys	Met	Val	Gln	Ile	Pro	Phe	Ser	Met	Lys
		690					695				700				
Asn	Leu	Lys	Ile	Asn	Phe	Lys	Lys	Gln	Asn	Lys	Val	Asp	Leu	Glu	Glu
705					710					715					720
Lys	Asp	Glu	Pro	Cys	Leu	Ile	His	Asn	Leu	Arg	Phe	Pro	Asp	Ala	Trp
				725						730					735
Leu	Met	Thr	Ser	Lys	Thr	Glu	Val	Met	Leu	Leu	Asn	Pro	Tyr	Arg	Val
			740					745					750		
Glu	Glu	Ala	Leu	Leu	Phe	Lys	Arg	Leu	Leu	Glu	Asn	His	Lys	Leu	Pro
		755						760				765			
Ala	Glu	Pro	Leu	Glu	Lys	Pro	Ile	Met	Leu	Thr	Glu	Ser	Leu	Phe	Asn
		770					775					780			
Gly	Ser	His	Tyr	Leu	Asp	Val	Leu	Tyr	Lys	Met	Thr	Ala	Asp	Asp	Gln
785					790					795					800
Arg	Tyr	Ser	Gly	Ser	Thr	Tyr	Leu	Ser	Asp	Pro	Arg	Leu	Thr	Ala	Asn
				805					810						815
Gly	Phe	Lys	Ile	Lys	Leu	Ile	Pro	Gly	Val	Ser	Ile	Thr	Glu	Asn	Tyr
			820						825				830		
Leu	Glu	Ile	Glu	Gly	Met	Ala	Asn	Cys	Leu	Pro	Phe	Tyr	Gly	Val	Ala
			835					840					845		
Asp	Leu	Lys	Glu	Ile	Leu	Asn	Ala	Ile	Leu	Asn	Arg	Asn	Ala	Lys	Glu
			850				855					860			
Val	Tyr	Glu	Cys	Arg	Pro	Arg	Lys	Val	Ile	Ser	Tyr	Leu	Glu	Gly	Glu
865					870					875					880
Ala	Val	Arg	Leu	Ser	Arg	Gln	Leu	Pro	Met	Tyr	Leu	Ser	Lys	Glu	Asp
				885						890					895
Ile	Gln	Asp	Ile	Ile	Tyr	Arg	Met	Lys	His	Gln	Phe	Gly	Asn	Glu	Ile
			900					905					910		
Lys	Glu	Cys	Val	His	Gly	Arg	Pro	Phe	Phe	His	His	Leu	Thr	Tyr	Leu
		915					920						925		
Pro	Glu	Thr	Thr												
															930

<210> 19  
 <211> 934  
 <212> PRT  
 <213> Homo sapiens

<400> 19															
Met	Ala	Val	Gln	Pro	Lys	Glu	Thr	Leu	Gln	Leu	Glu	Ser	Ala	Ala	Glu
1				5					10					15	
Val	Gly	Phe	Val	Arg	Phe	Phe	Gln	Gly	Met	Pro	Glu	Lys	Pro	Thr	Thr
			20					25					30		
Thr	Val	Arg	Leu	Phe	Asp	Arg	Gly	Asp	Phe	Tyr	Thr	Ala	His	Gly	Glu
			35				40					45			
Asp	Ala	Leu	Leu	Ala	Ala	Arg	Glu	Val	Phe	Lys	Thr	Gln	Gly	Val	Ile
			50				55				60				
Lys	Tyr	Met	Gly	Pro	Ala	Gly	Ala	Lys	Asn	Leu	Gln	Ser	Val	Val	Leu
65					70					75					80
Ser	Lys	Met	Asn	Phe	Glu	Ser	Phe	Val	Lys	Asp	Leu	Leu	Leu	Val	Arg
				85					90					95	

Gln	Tyr	Arg	Val	Glu	Val	Tyr	Lys	Asn	Arg	Ala	Gly	Asn	Lys	Ala	Ser
			100					105					110		
Lys	Glu	Asn	Asp	Trp	Tyr	Leu	Ala	Tyr	Lys	Ala	Ser	Pro	Gly	Asn	Leu
		115					120					125			
Ser	Gln	Phe	Glu	Asp	Ile	Leu	Phe	Gly	Asn	Asn	Asp	Met	Ser	Ala	Ser
		130					135				140				
Ile	Gly	Val	Val	Gly	Val	Lys	Met	Ser	Ala	Val	Asp	Gly	Gln	Arg	Gln
145					150					155					160
Val	Gly	Val	Gly	Tyr	Val	Asp	Ser	Ile	Gln	Arg	Lys	Leu	Gly	Leu	Cys
			165						170					175	
Glu	Phe	Pro	Asp	Asn	Asp	Gln	Phe	Ser	Asn	Leu	Glu	Ala	Leu	Leu	Ile
			180					185					190		
Gln	Ile	Gly	Pro	Lys	Glu	Cys	Val	Leu	Pro	Gly	Gly	Glu	Thr	Ala	Gly
		195					200					205			
Asp	Met	Gly	Lys	Leu	Arg	Gln	Ile	Ile	Gln	Arg	Gly	Gly	Ile	Leu	Ile
	210					215					220				
Thr	Glu	Arg	Lys	Lys	Ala	Asp	Phe	Ser	Thr	Lys	Asp	Ile	Tyr	Gln	Asp
225					230					235					240
Leu	Asn	Arg	Leu	Leu	Lys	Gly	Lys	Lys	Gly	Glu	Gln	Met	Asn	Ser	Ala
			245						250					255	
Val	Leu	Pro	Glu	Met	Glu	Asn	Gln	Val	Ala	Val	Ser	Ser	Leu	Ser	Ala
			260					265					270		
Val	Ile	Lys	Phe	Leu	Glu	Leu	Leu	Ser	Asp	Asp	Ser	Asn	Phe	Gly	Gln
		275					280					285			
Phe	Glu	Leu	Thr	Thr	Phe	Asp	Phe	Ser	Gln	Tyr	Met	Lys	Leu	Asp	Ile
	290					295					300				
Ala	Ala	Val	Arg	Ala	Leu	Asn	Leu	Phe	Gln	Gly	Ser	Val	Glu	Asp	Thr
305					310					315					320
Thr	Gly	Ser	Gln	Ser	Leu	Ala	Ala	Leu	Leu	Asn	Lys	Cys	Lys	Thr	Pro
			325						330					335	
Gln	Gly	Gln	Arg	Leu	Val	Asn	Gln	Trp	Ile	Lys	Gln	Pro	Leu	Met	Asp
			340					345					350		
Lys	Asn	Arg	Ile	Glu	Glu	Arg	Leu	Asn	Leu	Val	Glu	Ala	Phe	Val	Glu
	355						360					365			
Asp	Ala	Glu	Leu	Arg	Gln	Thr	Leu	Gln	Glu	Asp	Leu	Leu	Arg	Arg	Phe
	370					375					380				
Pro	Asp	Leu	Asn	Arg	Leu	Ala	Lys	Lys	Phe	Gln	Arg	Gln	Ala	Ala	Asn
385					390					395					400
Leu	Gln	Asp	Cys	Tyr	Arg	Leu	Tyr	Gln	Gly	Ile	Asn	Gln	Leu	Pro	Asn
			405						410					415	
Val	Ile	Gln	Ala	Leu	Glu	Lys	His	Glu	Gly	Lys	His	Gln	Lys	Leu	Leu
		420						425					430		
Leu	Ala	Val	Phe	Val	Thr	Pro	Leu	Thr	Asp	Leu	Arg	Ser	Asp	Phe	Ser
		435					440					445			
Lys	Phe	Gln	Glu	Met	Ile	Glu	Thr	Thr	Leu	Asp	Met	Asp	Gln	Val	Glu
	450					455					460				
Asn	His	Glu	Phe	Leu	Val	Lys	Pro	Ser	Phe	Asp	Pro	Asn	Leu	Ser	Glu
465					470					475					480
Leu	Arg	Glu	Ile	Met	Asn	Asp	Leu	Glu	Lys	Met	Gln	Ser	Thr	Leu	
			485						490					495	
Ile	Ser	Ala	Ala	Arg	Asp	Leu	Gly	Leu	Asp	Pro	Gly	Lys	Gln	Ile	Lys
		500						505					510		
Leu	Asp	Ser	Ser	Ala	Gln	Phe	Gly	Tyr	Tyr	Phe	Arg	Val	Thr	Cys	Lys
	515						520					525			
Glu	Glu	Lys	Val	Leu	Arg	Asn	Asn	Lys	Asn	Phe	Ser	Thr	Val	Asp	Ile
	530					535					540				
Gln	Lys	Asn	Gly	Val	Lys	Phe	Thr	Asn	Ser	Lys	Leu	Thr	Ser	Leu	Asn
545					550					555					560
Glu	Glu	Tyr	Thr	Lys	Asn	Lys	Thr	Glu	Tyr	Glu	Glu	Ala	Gln	Asp	Ala

				565					570					575			
Ile	Val	Lys	Glu	Ile	Val	Asn	Ile	Ser	Ser	Gly	Tyr	Val	Glu	Pro	Met		
			580					585					590				
Gln	Thr	Leu	Asn	Asp	Val	Leu	Ala	Gln	Leu	Asp	Ala	Val	Val	Ser	Phe		
		595					600					605					
Ala	His	Val	Ser	Asn	Gly	Ala	Pro	Val	Pro	Tyr	Val	Arg	Pro	Ala	Ile		
	610					615					620						
Leu	Glu	Lys	Gly	Gln	Gly	Arg	Ile	Ile	Leu	Lys	Ala	Ser	Arg	His	Ala		
625					630					635					640		
Cys	Val	Glu	Val	Gln	Asp	Glu	Ile	Ala	Phe	Ile	Pro	Asn	Asp	Val	Tyr		
				645					650					655			
Phe	Glu	Lys	Asp	Lys	Gln	Met	Phe	His	Ile	Ile	Thr	Gly	Pro	Asn	Met		
			660					665					670				
Gly	Gly	Lys	Ser	Thr	Tyr	Ile	Arg	Gln	Thr	Gly	Val	Ile	Val	Leu	Met		
		675					680					685					
Ala	Gln	Ile	Gly	Cys	Phe	Val	Pro	Cys	Glu	Ser	Ala	Glu	Val	Ser	Ile		
	690					695					700						
Val	Asp	Cys	Ile	Leu	Ala	Arg	Val	Gly	Ala	Gly	Asp	Ser	Gln	Leu	Lys		
705					710					715					720		
Gly	Val	Ser	Thr	Phe	Met	Ala	Glu	Met	Leu	Glu	Thr	Ala	Ser	Ile	Leu		
				725				730						735			
Arg	Ser	Ala	Thr	Lys	Asp	Ser	Leu	Ile	Ile	Ile	Asp	Glu	Leu	Gly	Arg		
			740					745					750				
Gly	Thr	Ser	Thr	Tyr	Asp	Gly	Phe	Gly	Leu	Ala	Trp	Ala	Ile	Ser	Glu		
		755					760					765					
Tyr	Ile	Ala	Thr	Lys	Ile	Gly	Ala	Phe	Cys	Met	Phe	Ala	Thr	His	Phe		
	770					775					780						
His	Glu	Leu	Thr	Ala	Leu	Ala	Asn	Gln	Ile	Pro	Thr	Val	Asn	Asn	Leu		
785					790					795					800		
His	Val	Thr	Ala	Leu	Thr	Thr	Glu	Glu	Thr	Leu	Thr	Met	Leu	Tyr	Gln		
				805					810					815			
Val	Lys	Lys	Gly	Val	Cys	Asp	Gln	Ser	Phe	Gly	Ile	His	Val	Ala	Glu		
			820					825					830				
Leu	Ala	Asn	Phe	Pro	Lys	His	Val	Ile	Glu	Cys	Ala	Lys	Gln	Lys	Ala		
		835					840						845				
Leu	Glu	Leu	Glu	Glu	Phe	Gln	Tyr	Ile	Gly	Glu	Ser	Gln	Gly	Tyr	Asp		
	850					855					860						
Ile	Met	Glu	Pro	Ala	Ala	Lys	Lys	Cys	Tyr	Leu	Glu	Arg	Glu	Gln	Gly		
865					870					875					880		
Glu	Lys	Ile	Ile	Gln	Glu	Phe	Leu	Ser	Lys	Val	Lys	Gln	Met	Pro	Phe		
				885					890					895			
Thr	Glu	Met	Ser	Glu	Glu	Asn	Ile	Thr	Ile	Lys	Leu	Lys	Gln	Leu	Lys		
			900					905					910				
Ala	Glu	Val	Ile	Ala	Lys	Asn	Asn	Ser	Phe	Val	Asn	Glu	Ile	Ile	Ser		
		915					920					925					
Arg	Ile	Lys	Val	Thr	Thr												
	930																

<210> 20  
 <211> 756  
 <212> PRT  
 <213> Homo sapiens

<400> 20  
 Met Ser Phe Val Ala Gly Val Ile Arg Arg Leu Asp Glu Thr Val Val  
 1 5 10 15  
 Asn Arg Ile Ala Ala Gly Glu Val Ile Gln Arg Pro Ala Asn Ala Ile  
 20 25 30  
 Lys Glu Met Ile Glu Asn Cys Leu Asp Ala Lys Ser Thr Ser Ile Gln

		35					40					45				
Val	Ile	Val	Lys	Glu	Gly	Gly	Leu	Lys	Leu	Ile	Gln	Ile	Gln	Asp	Asn	
	50					55					60					
Gly	Thr	Gly	Ile	Arg	Lys	Glu	Asp	Leu	Asp	Ile	Val	Cys	Glu	Arg	Phe	
65					70					75					80	
Thr	Thr	Ser	Lys	Leu	Gln	Ser	Phe	Glu	Asp	Leu	Ala	Ser	Ile	Ser	Thr	
				85					90					95		
Tyr	Gly	Phe	Arg	Gly	Glu	Ala	Leu	Ala	Ser	Ile	Ser	His	Val	Ala	His	
			100					105					110			
Val	Thr	Ile	Thr	Thr	Lys	Thr	Ala	Asp	Gly	Lys	Cys	Ala	Tyr	Arg	Ala	
		115					120					125				
Ser	Tyr	Ser	Asp	Gly	Lys	Leu	Lys	Ala	Pro	Pro	Lys	Pro	Cys	Ala	Gly	
	130					135					140					
Asn	Gln	Gly	Thr	Gln	Ile	Thr	Val	Glu	Asp	Leu	Phe	Tyr	Asn	Ile	Ala	
145					150					155					160	
Thr	Arg	Arg	Lys	Ala	Leu	Lys	Asn	Pro	Ser	Glu	Glu	Tyr	Gly	Lys	Ile	
				165					170					175		
Leu	Glu	Val	Val	Gly	Arg	Tyr	Ser	Val	His	Asn	Ala	Gly	Ile	Ser	Phe	
			180					185					190			
Ser	Val	Lys	Lys	Gln	Gly	Glu	Thr	Val	Ala	Asp	Val	Arg	Thr	Leu	Pro	
		195					200					205				
Asn	Ala	Ser	Thr	Val	Asp	Asn	Ile	Arg	Ser	Ile	Phe	Gly	Asn	Ala	Val	
	210					215					220					
Ser	Arg	Glu	Leu	Ile	Glu	Ile	Gly	Cys	Glu	Asp	Lys	Thr	Leu	Ala	Phe	
225					230					235					240	
Lys	Met	Asn	Gly	Tyr	Ile	Ser	Asn	Ala	Asn	Tyr	Ser	Val	Lys	Lys	Cys	
				245					250					255		
Ile	Phe	Leu	Leu	Phe	Ile	Asn	His	Arg	Leu	Val	Glu	Ser	Thr	Ser	Leu	
			260					265					270			
Arg	Lys	Ala	Ile	Glu	Thr	Val	Tyr	Ala	Ala	Tyr	Leu	Pro	Lys	Asn	Thr	
		275					280					285				
His	Pro	Phe	Leu	Tyr	Leu	Ser	Leu	Glu	Ile	Ser	Pro	Gln	Asn	Val	Asp	
	290					295					300					
Val	Asn	Val	His	Pro	Thr	Lys	His	Glu	Val	His	Phe	Leu	His	Glu	Glu	
305					310					315					320	
Ser	Ile	Leu	Glu	Arg	Val	Gln	Gln	His	Ile	Glu	Ser	Lys	Leu	Leu	Gly	
				325					330					335		
Ser	Asn	Ser	Ser	Arg	Met	Tyr	Phe	Thr	Gln	Thr	Leu	Leu	Pro	Gly	Leu	
			340					345					350			
Ala	Gly	Pro	Ser	Gly	Glu	Met	Val	Lys	Ser	Thr	Thr	Ser	Leu	Thr	Ser	
		355					360					365				
Ser	Ser	Thr	Ser	Gly	Ser	Ser	Asp	Lys	Val	Tyr	Ala	His	Gln	Met	Val	
		370					375				380					
Arg	Thr	Asp	Ser	Arg	Glu	Gln	Lys	Leu	Asp	Ala	Phe	Leu	Gln	Pro	Leu	
385					390					395					400	



<211> 1360  
 <212> PRT  
 <213> Homo sapiens

<400> 22

Met	Ser	Arg	Gln	Ser	Thr	Leu	Tyr	Ser	Phe	Phe	Pro	Lys	Ser	Pro	Ala
1				5					10					15	
Leu	Ser	Asp	Ala	Asn	Lys	Ala	Ser	Ala	Arg	Ala	Ser	Arg	Glu	Gly	Gly
			20					25					30		
Arg	Ala	Ala	Ala	Ala	Pro	Gly	Ala	Ser	Pro	Ser	Pro	Gly	Gly	Asp	Ala
			35				40					45			
Ala	Trp	Ser	Glu	Ala	Gly	Pro	Gly	Pro	Arg	Pro	Leu	Ala	Arg	Ser	Ala
	50					55					60				
Ser	Pro	Pro	Lys	Ala	Lys	Asn	Leu	Asn	Gly	Gly	Leu	Arg	Arg	Ser	Val
65					70					75					80
Ala	Pro	Ala	Ala	Pro	Thr	Ser	Cys	Asp	Phe	Ser	Pro	Gly	Asp	Leu	Val
				85					90					95	
Trp	Ala	Lys	Met	Glu	Gly	Tyr	Pro	Trp	Trp	Pro	Cys	Leu	Val	Tyr	Asn
			100					105					110		
His	Pro	Phe	Asp	Gly	Thr	Phe	Ile	Arg	Glu	Lys	Gly	Lys	Ser	Val	Arg
			115				120					125			
Val	His	Val	Gln	Phe	Phe	Asp	Asp	Ser	Pro	Thr	Arg	Gly	Trp	Val	Ser
	130					135					140				
Lys	Arg	Leu	Leu	Lys	Pro	Tyr	Thr	Gly	Ser	Lys	Ser	Lys	Glu	Ala	Gln
145					150					155					160
Lys	Gly	Gly	His	Phe	Tyr	Ser	Ala	Lys	Pro	Glu	Ile	Leu	Arg	Ala	Met
				165					170					175	
Gln	Arg	Ala	Asp	Glu	Ala	Leu	Asn	Lys	Asp	Lys	Ile	Lys	Arg	Leu	Glu
			180					185					190		
Leu	Ala	Val	Cys	Asp	Glu	Pro	Ser	Glu	Pro	Glu	Glu	Glu	Glu	Glu	Met
			195				200					205			
Glu	Val	Gly	Thr	Thr	Tyr	Val	Thr	Asp	Lys	Ser	Glu	Glu	Asp	Asn	Glu
	210					215					220				
Ile	Glu	Ser	Glu	Glu	Glu	Val	Gln	Pro	Lys	Thr	Gln	Gly	Ser	Arg	Arg
225					230					235					240
Ser	Ser	Arg	Gln	Ile	Lys	Lys	Arg	Arg	Val	Ile	Ser	Asp	Ser	Glu	Ser
				245					250					255	
Asp	Ile	Gly	Gly	Ser	Asp	Val	Glu	Phe	Lys	Pro	Asp	Thr	Lys	Glu	Glu
			260					265					270		
Gly	Ser	Ser	Asp	Glu	Ile	Ser	Ser	Gly	Val	Gly	Asp	Ser	Glu	Ser	Glu
		275				280					285				
Gly	Leu	Asn	Ser	Pro	Val	Lys	Val	Ala	Arg	Lys	Arg	Lys	Arg	Met	Val
	290					295					300				
Thr	Gly	Asn	Gly	Ser	Leu	Lys	Arg	Lys	Ser	Ser	Arg	Lys	Glu	Thr	Pro
305					310					315					320
Ser	Ala	Thr	Lys	Gln	Ala	Thr	Ser	Ile	Ser	Ser	Glu	Thr	Lys	Asn	Thr
				325						330				335	
Leu	Arg	Ala	Phe	Ser	Ala	Pro	Gln	Asn	Ser	Glu	Ser	Gln	Ala	His	Val
			340					345					350		
Ser	Gly	Gly	Gly	Asp	Asp	Ser	Ser	Arg	Pro	Thr	Val	Trp	Tyr	His	Glu
		355					360					365			
Thr	Leu	Glu	Trp	Leu	Lys	Glu	Glu	Lys	Arg	Arg	Asp	Glu	His	Arg	Arg
	370					375					380				
Arg	Pro	Asp	His	Pro	Asp	Phe	Asp	Ala	Ser	Thr	Leu	Tyr	Val	Pro	Glu
385					390					395					400
Asp	Phe	Leu	Asn	Ser	Cys	Thr	Pro	Gly	Met	Arg	Lys	Trp	Trp	Gln	Ile
				405					410					415	
Lys	Ser	Gln	Asn	Phe	Asp	Leu	Val	Ile	Cys	Tyr	Lys	Val	Gly	Lys	Phe
			420					425					430		

bioRxiv preprint doi: <https://doi.org/10.1101/000000>; this version posted January 1, 2014. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

Tyr	Glu	Leu	Tyr	His	Met	Asp	Ala	Leu	Ile	Gly	Val	Ser	Glu	Leu	Gly
		435					440					445			
Leu	Val	Phe	Met	Lys	Gly	Asn	Trp	Ala	His	Ser	Gly	Phe	Pro	Glu	Ile
		450				455					460				
Ala	Phe	Gly	Arg	Tyr	Ser	Asp	Ser	Leu	Val	Gln	Lys	Gly	Tyr	Lys	Val
465					470					475					480
Ala	Arg	Val	Glu	Gln	Thr	Glu	Thr	Pro	Glu	Met	Met	Glu	Ala	Arg	Cys
				485					490					495	
Arg	Lys	Met	Ala	His	Ile	Ser	Lys	Tyr	Asp	Arg	Val	Val	Arg	Arg	Glu
			500					505					510		
Ile	Cys	Arg	Ile	Ile	Thr	Lys	Gly	Thr	Gln	Thr	Tyr	Ser	Val	Leu	Glu
		515					520					525			
Gly	Asp	Pro	Ser	Glu	Asn	Tyr	Ser	Lys	Tyr	Leu	Leu	Ser	Leu	Lys	Glu
		530				535					540				
Lys	Glu	Glu	Asp	Ser	Ser	Gly	His	Thr	Arg	Ala	Tyr	Gly	Val	Cys	Phe
545					550					555					560
Val	Asp	Thr	Ser	Leu	Gly	Lys	Phe	Phe	Ile	Gly	Gln	Phe	Ser	Asp	Asp
				565					570					575	
Arg	His	Cys	Ser	Arg	Phe	Arg	Thr	Leu	Val	Ala	His	Tyr	Pro	Pro	Val
			580					585					590		
Gln	Val	Leu	Phe	Glu	Lys	Gly	Asn	Leu	Ser	Lys	Glu	Thr	Lys	Thr	Ile
		595					600					605			
Leu	Lys	Ser	Ser	Leu	Ser	Cys	Ser	Leu	Gln	Glu	Gly	Leu	Ile	Pro	Gly
		610				615					620				
Ser	Gln	Phe	Trp	Asp	Ala	Ser	Lys	Thr	Leu	Arg	Thr	Leu	Leu	Glu	Glu
625					630					635					640
Glu	Tyr	Phe	Arg	Glu	Lys	Leu	Ser	Asp	Gly	Ile	Gly	Val	Met	Leu	Pro
				645					650					655	
Gln	Val	Leu	Lys	Gly	Met	Thr	Ser	Glu	Ser	Asp	Ser	Ile	Gly	Leu	Thr
			660					665				670			
Pro	Gly	Glu	Lys	Ser	Glu	Leu	Ala	Leu	Ser	Ala	Leu	Gly	Gly	Cys	Val
		675					680					685			
Phe	Tyr	Leu	Lys	Lys	Cys	Leu	Ile	Asp	Gln	Glu	Leu	Ser	Met	Ala	
		690				695					700				
Asn	Phe	Glu	Glu	Tyr	Ile	Pro	Leu	Asp	Ser	Asp	Thr	Val	Ser	Thr	Thr
705					710					715					720
Arg	Ser	Gly	Ala	Ile	Phe	Thr	Lys	Ala	Tyr	Gln	Arg	Met	Val	Leu	Asp
				725					730					735	
Ala	Val	Thr	Leu	Asn	Asn	Leu	Glu	Ile	Phe	Leu	Asn	Gly	Thr	Asn	Gly
			740					745					750		
Ser	Thr	Glu	Gly	Thr	Leu	Leu	Glu	Arg	Val	Asp	Thr	Cys	His	Thr	Pro
		755					760					765			
Phe	Gly	Lys	Arg	Leu	Leu	Lys	Gln	Trp	Leu	Cys	Ala	Pro	Leu	Cys	Asn
		770				775					780				
His	Tyr	Ala	Ile	Asn											





<211> 389  
 <212> PRT  
 <213> Homo sapiens

<400> 23  
 Met Ala Gln Pro Lys Gln Glu Arg Val Ala Arg Ala Arg His Gln Arg  
 1 5 10 15  
 Ser Glu Thr Ala Arg His Gln Arg Ser Glu Thr Ala Lys Thr Pro Thr  
 20 25 30  
 Leu Gly Asn Arg Gln Thr Pro Thr Leu Gly Asn Arg Gln Thr Pro Arg  
 35 40 45  
 Leu Gly Ile His Ala Arg Pro Arg Arg Arg Ala Thr Thr Ser Leu Leu  
 50 55 60  
 Thr Leu Leu Leu Ala Phe Gly Lys Asn Ala Val Arg Cys Ala Leu Ile  
 65 70 75 80  
 Gly Pro Gly Ser Leu Thr Ser Arg Thr Arg Pro Leu Thr Glu Pro Leu  
 85 90 95  
 Gly Glu Lys Glu Arg Arg Glu Val Phe Phe Pro Pro Arg Pro Glu Arg  
 100 105 110  
 Val Glu His Asn Val Glu Ser Ser Arg Trp Glu Pro Arg Arg Arg Gly  
 115 120 125  
 Ala Cys Gly Ser Arg Gly Gly Asn Phe Pro Ser Pro Arg Gly Gly Ser  
 130 135 140  
 Gly Val Ala Ser Leu Glu Arg Ala Glu Asn Ser Ser Thr Glu Pro Ala  
 145 150 155 160  
 Lys Ala Ile Lys Pro Ile Asp Arg Lys Ser Val His Gln Ile Cys Ser  
 165 170 175  
 Gly Pro Val Val Pro Ser Leu Arg Pro Asn Ala Val Lys Glu Leu Val  
 180 185 190  
 Glu Asn Ser Leu Asp Ala Gly Ala Thr Asn Val Asp Leu Lys Leu Lys  
 195 200 205  
 Asp Tyr Gly Val Asp Leu Ile Glu Val Ser Gly Asn Gly Cys Gly Val  
 210 215 220  
 Glu Glu Glu Asn Phe Glu Gly Phe Thr Leu Lys His His Thr Cys Lys  
 225 230 235 240  
 Ile Gln Glu Phe Ala Asp Leu Thr Gln Val Glu Thr Phe Gly Phe Arg  
 245 250 255  
 Gly Glu Ala Leu Ser Ser Leu Cys Ala Leu Ser Asp Val Thr Ile Ser  
 260 265 270  
 Thr Cys Arg Val Ser Ala Lys Val Gly Thr Arg Leu Val Phe Asp His  
 275 280 285  
 Tyr Gly Lys Ile Ile Gln Lys Thr Pro Tyr Pro Arg Pro Arg Gly Met  
 290 295 300  
 Thr Val Ser Val Lys Gln Leu Phe Ser Thr Leu Pro Val His His Lys  
 305 310 315 320  
 Glu Phe Gln Arg Asn Ile Lys Lys Lys Arg Ala Cys Phe Pro Phe Ala  
 325 330 335  
 Phe Cys Arg Asp Cys Gln Phe Pro Glu Ala Ser Pro Ala Met Leu Pro  
 340 345 350  
 Val Gln Pro Val Glu Leu Thr Pro Arg Ser Thr Pro Pro His Pro Cys  
 355 360 365  
 Ser Leu Glu Asp Asn Val Ile Thr Val Phe Ser Ser Val Lys Asn Gly  
 370 375 380  
 Pro Gly Ser Ser Arg  
 385

<210> 24  
 <211> 264  
 <212> PRT

<213> Homo sapiens

<400> 24

Met	Cys	Pro	Trp	Arg	Pro	Arg	Leu	Gly	Arg	Arg	Cys	Met	Val	Ser	Pro
1				5				10						15	
Arg	Glu	Ala	Asp	Leu	Gly	Pro	Gln	Lys	Asp	Thr	Arg	Leu	Asp	Leu	Pro
			20					25					30		
Arg	Ser	Pro	Ala	Arg	Ala	Pro	Arg	Glu	Gln	Asn	Ser	Leu	Gly	Glu	Val
		35					40					45			
Asp	Arg	Arg	Gly	Pro	Arg	Glu	Gln	Thr	Arg	Ala	Pro	Ala	Thr	Ala	Ala
	50					55					60				
Pro	Pro	Arg	Pro	Leu	Gly	Ser	Arg	Gly	Ala	Glu	Ala	Ala	Glu	Pro	Gln
65				70						75				80	
Glu	Gly	Leu	Ser	Ala	Thr	Val	Ser	Ala	Cys	Phe	Gln	Glu	Gln	Gln	Glu
				85					90					95	
Met	Asn	Thr	Leu	Gln	Gly	Pro	Val	Ser	Phe	Lys	Asp	Val	Ala	Val	Asp
			100					105					110		
Phe	Thr	Gln	Glu	Glu	Trp	Arg	Gln	Leu	Asp	Pro	Asp	Glu	Lys	Ile	Ala
		115					120					125			
Tyr	Gly	Asp	Val	Met	Leu	Glu	Asn	Tyr	Ser	His	Leu	Val	Ser	Val	Gly
	130					135					140				
Tyr	Asp	Tyr	His	Gln	Ala	Lys	His	His	His	Gly	Val	Glu	Val	Lys	Glu
145				150						155				160	
Val	Glu	Gln	Gly	Glu	Glu	Pro	Trp	Ile	Met	Glu	Gly	Glu	Phe	Pro	Cys
			165						170					175	
Gln	His	Ser	Pro	Glu	Pro	Ala	Lys	Ala	Ile	Lys	Pro	Ile	Asp	Arg	Lys
			180					185					190		
Ser	Val	His	Gln	Ile	Cys	Ser	Gly	Pro	Val	Val	Leu	Ser	Leu	Ser	Thr
		195					200					205			
Ala	Val	Lys	Glu	Leu	Val	Glu	Asn	Ser	Leu	Asp	Ala	Gly	Ala	Thr	Asn
	210					215					220				
Ile	Asp	Leu	Lys	Leu	Lys	Asp	Tyr	Gly	Val	Asp	Leu	Ile	Glu	Val	Ser
225				230						235				240	
Asp	Asn	Gly	Cys	Gly	Val	Glu	Glu	Glu	Asn	Phe	Glu	Gly	Leu	Ile	Ser
			245						250					255	
Phe	Ser	Ser	Glu	Thr	Ser	His	Met								
			260												

<210> 25

<211> 264

<212> PRT

<213> Homo sapiens

<400> 25

Met	Cys	Pro	Trp	Arg	Pro	Arg	Leu	Gly	Arg	Arg	Cys	Met	Val	Ser	Pro
1				5				10						15	
Arg	Glu	Ala	Asp	Leu	Gly	Pro	Gln	Lys	Asp	Thr	Arg	Leu	Asp	Leu	Pro
			20					25					30		
Arg	Ser	Pro	Ala	Arg	Ala	Pro	Arg	Glu	Gln	Asn	Ser	Leu	Gly	Glu	Val
		35					40					45			
Asp	Arg	Arg	Gly	Pro	Arg	Glu	Gln	Thr	Arg	Ala	Pro	Ala	Thr	Ala	Ala
	50					55					60				
Pro	Pro	Arg	Pro	Leu	Gly	Ser	Arg	Gly	Ala	Glu	Ala	Ala	Glu	Pro	Gln
65				70						75				80	
Glu	Gly	Leu	Ser	Ala	Thr	Val	Ser	Ala	Cys	Phe	Gln	Glu	Gln	Gln	Glu
				85					90					95	
Met	Asn	Thr	Leu	Gln	Gly	Pro	Val	Ser	Phe	Lys	Asp	Val	Ala	Val	Asp
			100					105					110		
Phe	Thr	Gln	Glu	Glu	Trp	Arg	Gln	Leu	Asp	Pro	Asp	Glu	Lys	Ile	Ala

